Tactical Control System
Preliminary Design Review

Part 2 - Day 2

Outrider Datalink Control Module (ODCM)
Computer Software Configuration Items (CSCIs) and
Computer Software Components (CSCs)

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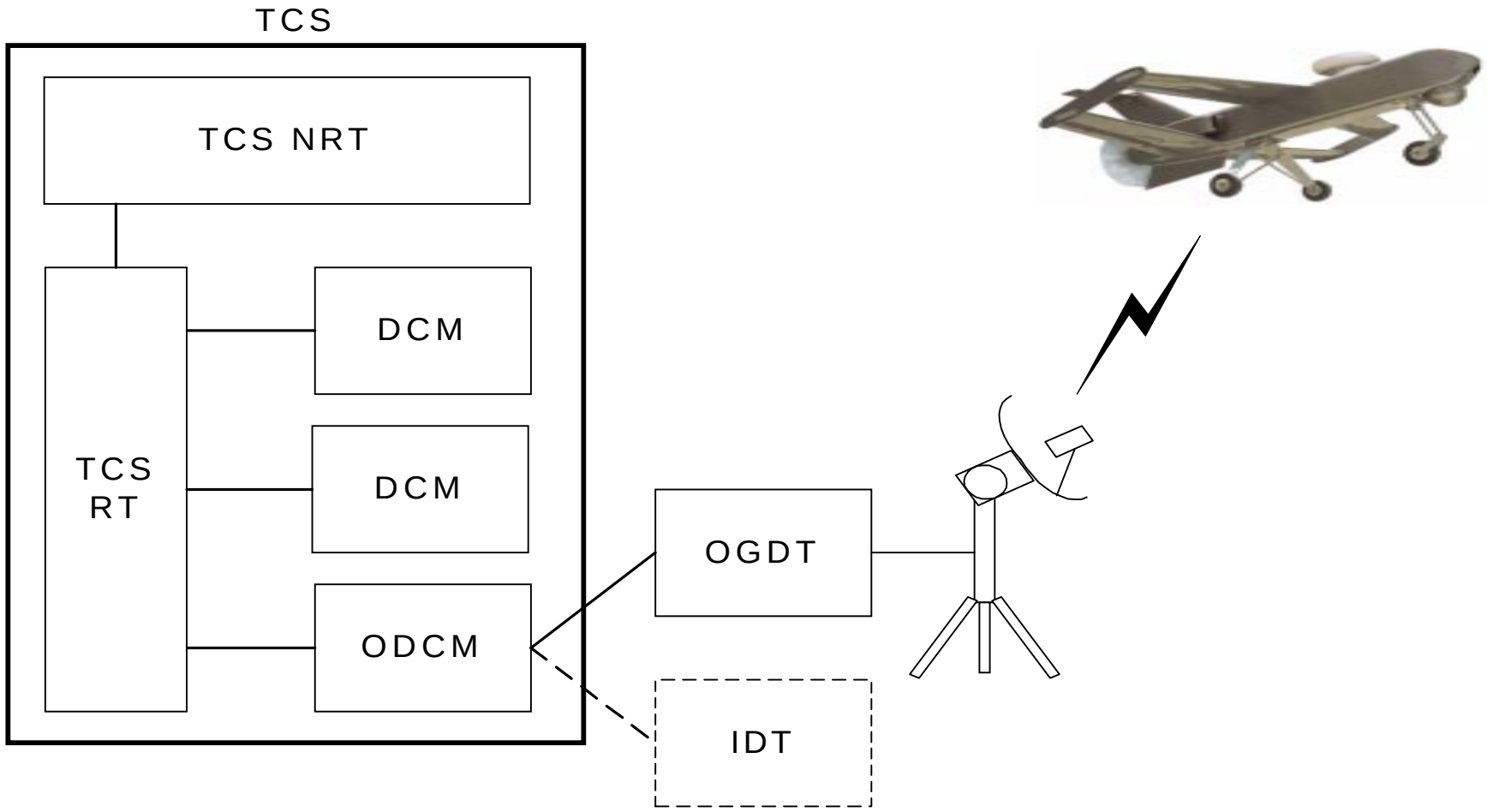
Presentation Overview

- TCS High-Level Architecture
- ODCM Functional Allocation
- ODCM Configuration – TAC-3
- ODCM Configuration – VME
- ODCM Software Elements
- ODCM Software Design

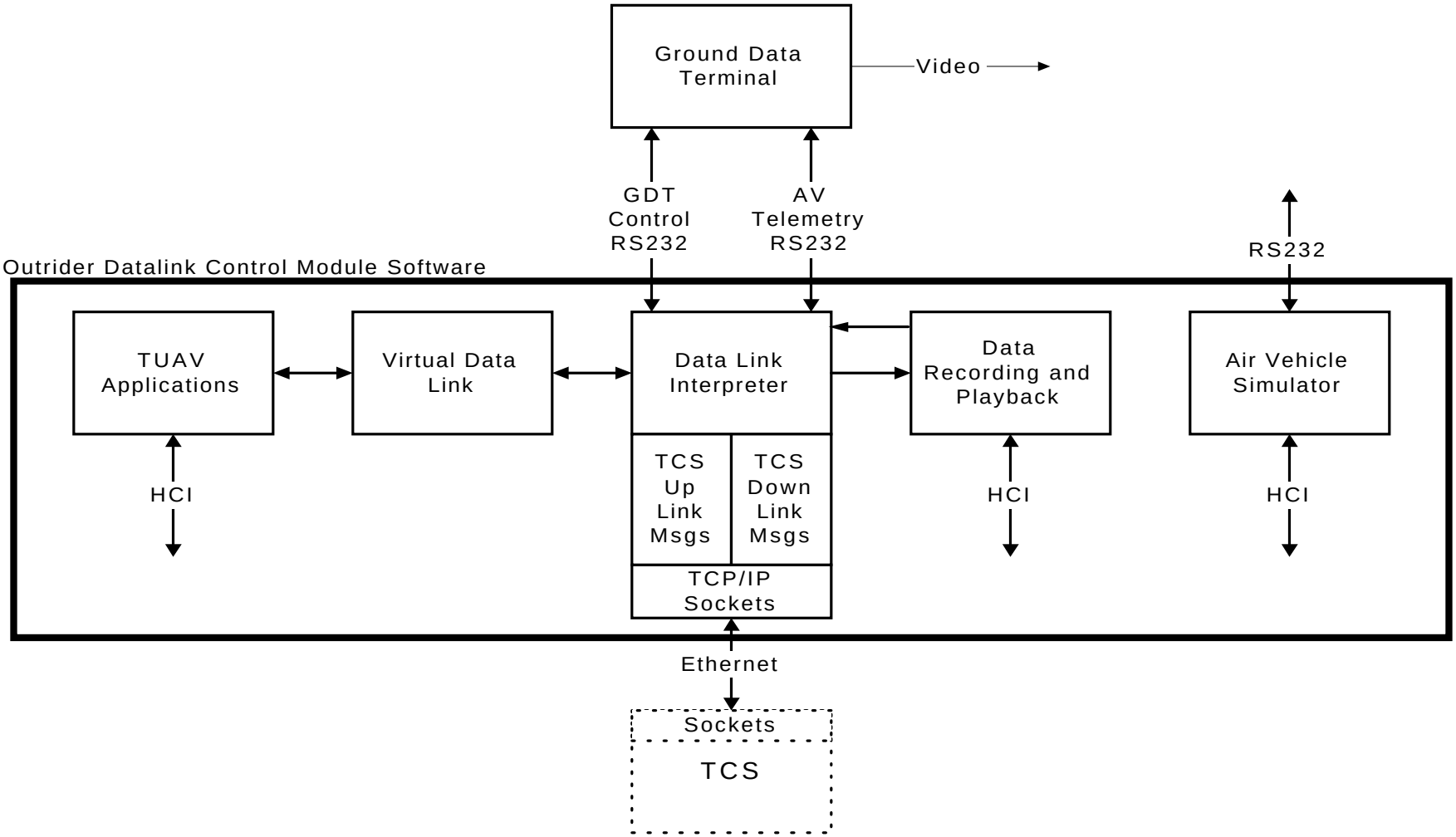
TCS High-Level Architecture



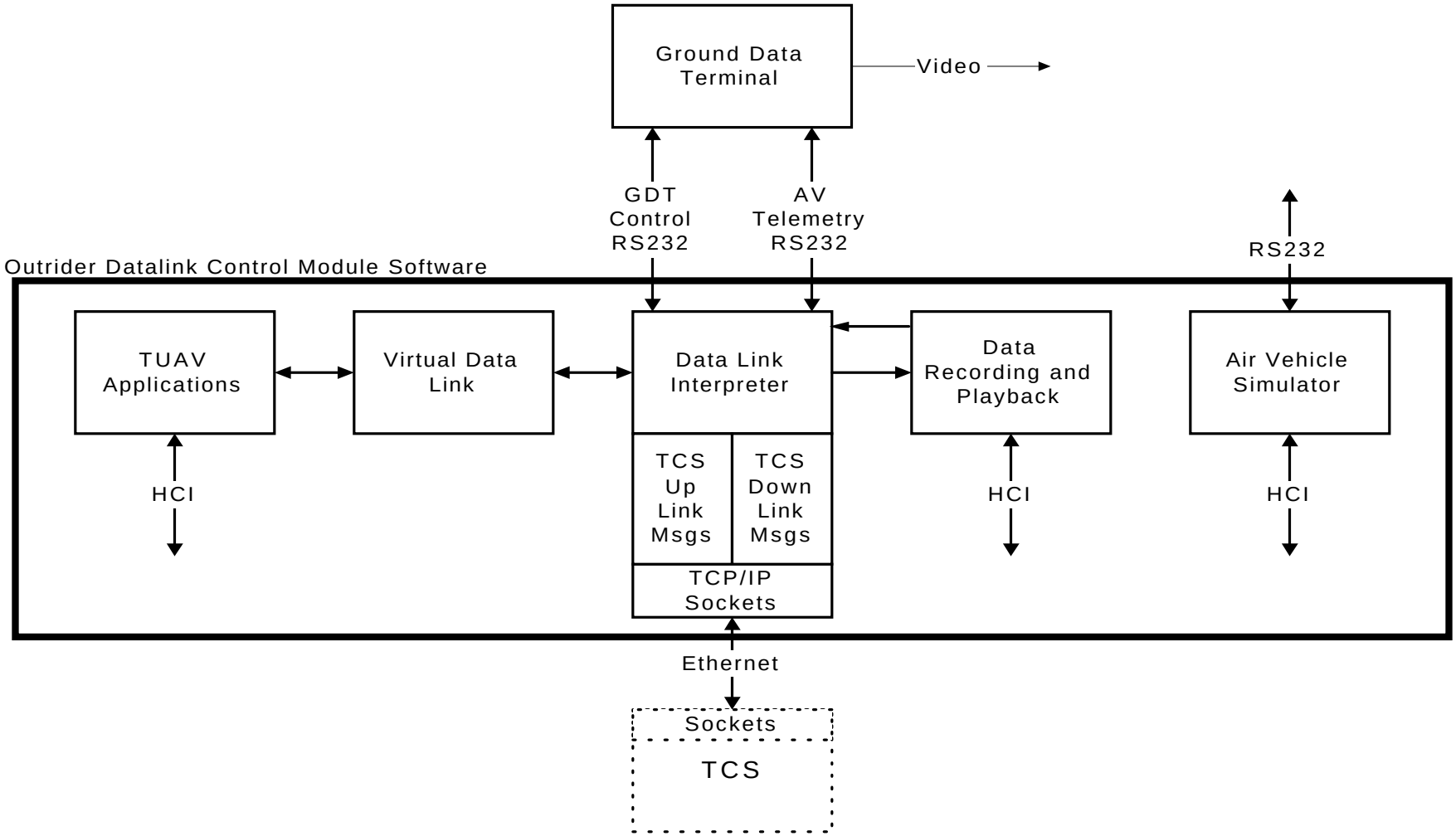
ODCM Functional Allocation

- **Air Vehicle Standard Interface (AVSI, TCS 229) Version 1.1**
- **Outrider Data Link Interpreter (DLI) – Proven Outrider interface with the GDT and air vehicle**
- **Outrider Virtual Data Link (VDL) – Proven Outrider interface with the TUAV Ground Control Station (GCS) applications**
- **TCP/IP Sockets - JTA/DII/COE compliant TCS interface**
- **Air Vehicle Simulator – Proven Outrider test driver**
- **Data Recording and Playback – Proven Outrider test driver**

ODCM Software Configuration (TAC-3)



ODCM Software Configuration (VME)



ODCM Software Elements

- **TUAV CSCI – Outrider Ground Control Station (GCS) Software**
- **ODCM CSCI – TCS Unique Additions to the Outrider GCS Software**
  - ⇒**Downlink Message CSC – Converts Outrider Downlink Messages into TCS AVSI 1.1 Downlink Message Formats**
  - ⇒**Uplink Message CSC – Converts TCS AVSI 1.1 Uplink Messages into Outrider Uplink Message Formats**
  - ⇒**TCP/IP Sockets Communication CSC – Performs TCP/IP Data Transfers with TCS**
  - ⇒**AV Simulator CSC – Upgrade to Outrider GCS AV Simulator to Support ODCM Testing**
  - ⇒**Data Recording and Playback CSC – Upgrade to Outrider GCS Recording and Playback Capability to Support ODCM Testing**

ODCM Software Design

- **TUAV CSCI**
  - ⇒**Current Version (TUAV 2.2) of Outrider GCS Talon Software**
  - ⇒**Provides Outrider AV Communications**
  - ⇒**Provides Ground Data Terminal Control**
  - ⇒**Provides Data Link Interpreter for Outrider AV Messages**
  - ⇒**Provides Virtual Data Link (Shared Memory) Structure for Outrider Message Data and Internal GCS Data**
  - ⇒**Provides Human-Computer Interface for Outrider GCS Control and Monitoring**
  - ⇒**Outrider Functions Retained as Necessary to Support TCS/ODCM Requirements**

ODCM Software Design (continued)

- **Downlink Message CSC**
  - ⇒**Classes**
    - ⇒**Purpose: One class which converts Outrider specific downlink message data into the messages and formats required by TCS AVSI 1.1**
    - ⇒**Methods: Various procedures used for specific message field translation and computation**
    - ⇒**Variables: Internal data structures as necessary and Outrider data obtained from the Virtual Data Link (VDL)**
    - ⇒**Interfaces: Interfaces with the Data Link Interpreter (DLI), VDL and the TCP/IP Sockets Communication CSC**
    - ⇒**APIs: None specific to this CSC. Uses Outrider DLI and VDL APIs as necessary. Uses the TCP/IP Sockets API to send messages to TCS.**
  - ⇒**CSC Design/Structure**
    - ⇒**Inputs: Outrider message data as processed by the DLI and placed into the VDL structure.**
    - ⇒**Outputs: Messages destined for TCS in AVSI 1.1 format**
  - ⇒**Relationship to Other CSCs – As described above.**
  - ⇒**Algorithms**

- ⇒Data Control: As defined by the DLI, VDL and AVSI 1.1
- ⇒Functions/Subfunctions: As required to support AVSI 1.1 data formats
- ⇒Behavior: Operates as part of the Outrider DLI task

⇒Control

- ⇒Start: Started as part of the Outrider (TUAV) applications
- ⇒Recovery: Built into processing as necessary to support APIs and AVSI 1.1 requirements
- ⇒Shutdown: Shutdown as part of the Outrider (TUAV) applications

⇒Storage Allocation – Must operate along with TUAV applications in the available memory (32 Mb)

⇒Timing Allocations

- ⇒Latency: Must introduce minimal (<250 ms) delay consistent with the real-time nature of the Outrider data link and support the requirements of AVSI 1.1
- ⇒Response: As defined by AVSI 1.1

⇒Resource Utilization Allocations

- ⇒Processor: Maintains Outrider response characteristics and AVSI 1.1
- ⇒Interfaces: Maintains Outrider response characteristics and AVSI 1.1

ODCM Software Design (continued)

- **Uplink Message CSC**
  - ⇒**Classes**
    - ⇒**Purpose: One class which converts AVSI 1.1 specific uplink message data into the messages and formats required by Outrider**
    - ⇒**Methods: Various procedures used for specific message field translation and computation**
    - ⇒**Variables: Internal data structures as necessary and Outrider data placed into the Virtual Data Link (VDL)**
    - ⇒**Interfaces: Interfaces with the Data Link Interpreter (DLI), VDL and the TCP/IP Sockets Communication CSC**
    - ⇒**APIs: None specific to this CSC. Uses Outrider DLI and VDL APIs as necessary. Uses the TCP/IP Sockets API to receive messages from TCS.**
  - ⇒**CSC Design/Structure**
    - ⇒**Inputs: TCS message data per AVSI 1.1**
    - ⇒**Outputs: Messages destined for Outrider**
  - ⇒**Relationship to Other CSCs – As described above.**
  - ⇒**Algorithms**
    - ⇒**Data Control: As defined by the DLI, VDL and AVSI 1.1**

- ⇒Functions/Subfunctions: As required to support AVSI 1.1 data formats
- ⇒Behavior: Operates as part of the Outrider DLI task

⇒Control

- ⇒Start: Started as part of the Outrider (TUAV) applications
- ⇒Recovery: Built into processing as necessary to support APIs and AVSI 1.1 requirements
- ⇒Shutdown: Shutdown as part of the Outrider (TUAV) applications

⇒Storage Allocation – Must operate along with TUAV applications in the available memory (32 Mb)

⇒Timing Allocations

- ⇒Latency: Must introduce minimal (<250 ms) delay consistent with the real-time nature of the Outrider data link and support the requirements of AVSI 1.1
- ⇒Response: As defined by AVSI 1.1

⇒Resource Utilization Allocations

- ⇒Processor: Maintains Outrider response characteristics and AVSI 1.1
- ⇒Interfaces: Maintains Outrider response characteristics and AVSI 1.1

ODCM Software Design (continued)

- **TCP/IP Sockets Communication CSC**
  - ⇒**Standard TCP/IP package that is JTA/DII/COE compliant**
  - ⇒**Integrated with Outrider DLI, ODCM Message Uplink CSC and ODCM Message Downlink CSC**

ODCM Software Design (continued)

- **AV Simulator CSC**
  - ⇒**Proven simulator design used in the Outrider GCS**
  - ⇒**Modified HCI and processing procedures to allow full range of data control for ODCM testing**

ODCM Software Design (continued)

- **Data Recording and Playback CSC**
  - ⇒**Proven recording and playback design used in the Outrider GCS**
  - ⇒**Modified HCI and procedures to support ODCM data recording (multi-level) and playback**